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Rotifer Diversity of Gilbili Lake of Chandrapur District (M.S.), India

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Abstract: *Rotifer are small living things mainly habituating all water bodies worldwide. These are making up a phylum of microscopic and near-microscopic pseudocoelomate animals. They predominately present in thin water film. Rotifer eats dead bacteria, algae and protozoa and contribute in nutrient recycling. There are about 2200 species of rotifer present all over the world.The present work was carried out to document the seasonal variation in the Rotifera species from the Gilbili lake of Chandrapur district of Maharashtra from February 2024 to January 2025. In the present investigation Rotifers are represented by 22 species.*

Keywords: Rotifer, Gilbili lake, Diversity

I. INTRODUCTION

Rotifers are most important component of an aquatic ecosystem and considered as a microscopic soft body freshwater invertebrates and also they play a significant role in an aquatic food chain. According to Hulyal and Kaliwal (2008) freshwater rotifers play an important role in the conversion of plant origin food to animal food and serve as prey to other smaller predatory fauna. Planktonic rotifers have a very short life cycle under favorable conditions of temperature, food and photoperiod. Since the rotifers have short reproductive stages they increase in abundance rapidly under favorable environmental conditions (Dhanapathi, 2000). They are widely distributed in inland water bodies, such as in lakes, dam, ponds and rivers. Due to fast reproductive rates and dispersal capabilities they can be quickly colonize new habitats and often numerically dominate these communities.

During the present study rotifers were found the most dominant group among all the zooplanktons. Taxonomic dominance of rotifers was observed by several researchers like Sampaio, *et. al.*, (2002) and Kudari, V.A. *et .al.*, (2005).. The many workers like Moitra S.K. and Bhaumik, M. L. (1968), Choube, (1991), Jayabhaye U.M. and Madalapure, (2006) and Sharma R. and Capoor, A. (2010) reported that the rotifera as the most abundant species in their studies on different water bodies of India.

II. MATERIAL AND METHODS

The Gilbili lake is fresh water lake situated 25 km from Chandrapur district place of Maharashtra state. It is situated at about 691 meter above the mean sea level and is at 19˚55' 37.22" N latitude and 79˚ 28' 44.27" E longitude.

For the planktonic study sample were collected monthly from each site of lake. The samples were collected from three sites in the morning hours between 8:30 to 10:30 a.m. 50 lit of water sample was filtered through the plankton net made of bolting silk number 25 with mesh size 64 time. The collected samples were allowed to settle down by adding Lugol's iodine. Sedimentation requires 24 hrs, after which supernatant was removed and concentrate was made up to 50 ml its depending the number of plankton and preserved in 5% formalin for additional studies. For the quantitative study, the concentrated sample was shaken and immediately one drop of sample was taken on a clear micro side with the help of a standard dropper, the whole drop was then carefully covered with the cover glass and observed. Plankton identification up to genera and whenever possible up to species level was classified according to keys given by Prescott (1954), Edmonson (1959), Sehgal (1983), Adoni (1985) and APHA (1985) and standard analysis was undertaken as per Zar (2005).

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Quantitative study of plankton was done by Sedgwick – Rafter cell method.

III. RESULT AND DISCUSSION

In the present investigation Rotifers are represented by 22 species at all the sampling sites of lake. Kamble B. B. and Meshram, C. B. (2005) reported 5 species of rotifers in Khatijapur tank of Achalpur, Amravati (M.S.), Pawar S.K. and Pulle, J.S. (2005) observed 28 species of rotifers in Petwadaj dam of Nanded (M.S.), Sahoo and Jameson, (2006) reported twenty five species of rotifers in a fish pond in Thothukudi, Tamilnadu. Jayabhaye and Madalapoure, (2006) reported 14 species of rotifers in Parola dam of Hingoli (M.S.),Sharma, M. S. *et.al.,* (2007) noted 28 species of rotifers in and around Udaipur city, Rajasthan. Jeelani and Kaur, (2014) observed 27 species of rotifers in Dal lake, Kashmir. ShashikantSitre, (2014) reported 9 species of rotifers in Naik lake of Nagpur city (M.S.).Among the different species of Rotifers, *Brachionusfalcatus,* and *Bronchionusbiedentata*was dominant followed by *Cephalodellagibba and Filiniaopoloensis.* Charjan, *et.al.,* (2008) observed that presence of the*Brachionussp.* is a definite indicator of the eutrophic nature of lake. The higher diversity of the *Brachionus sp.* in a zooplankton community indicates that most of the lake is polluted by the organic pollution mostly contributed by the domestic sewage. Gadekar, G. P. (2014) observed among the rotifers *Brachionusterminalis*, *Brachionusfalcatus, Brachionusangularis*, *Keratellatropica, Cephlodellagibba*, *Lecane sp.* were the dominant species in Railway Pond, Gondia.

In the present investigation dominance of Rotifers as a group as well as *cephlodellagibba*indicates eutrophic nature of the Gilbili lake. During the present investigation the rotifers were maximum during the winter season and minimum during the monsoon season in Gilbili lake. Kedar, G. T. (2007) recorded maximum Rotifers during the March and minimum during July. A.M. Watkar and M.P. Barbate (2013) observed maximum Rotifers during winter season and minimum during inmonsoon season Kolarriver, Saoner town, District Nagpur (M.S). GunwantGadekar, (2014) in his study noted that the population density of rotifers were maximum in winter, in December month and minimum in monsoon season, in June month in Pangdi Lake of Gondia, District Gondia, (M.S.) and SitreShashikant (2014) reported rotifers were minimum in monsoon season in Naik lake of Nagpur City (M.S.). Mahajan, V.S. and Harney, N.V. (2016) observed maximum Rotifers during in summer season and minimum during the mansoon season in Mohabala lake ofBhadrawati, District Chandrapur (M.S.), India.Jadhav et al., (2012) recorded 13 genera of Zooplankton from Sinakolegoan Dam, Osmanabad District, Maharashtra. Density of Rotifera was least in the monsoon season. Maximum density of Cladocera and Copepoda observed in summer season and Ostracoda did not show any seasonal remarkable fluctuation, Thakur et al., (2013) investigated the diversity of plankton in three lakes located in Himachal Pradesh to examine the presence, absence or dominance of certain species related to the status of lakes. They recorded 79 species belonging zooplanktons of which they found some species as bioindicators of oligotrophic state, Gadekar (2014) investigated Railway pond of Gondia city and observed 20 species of zooplanktons, of which 3 species belong to Protozoa, 10 species to Rotifera, 3 species to Cladocera, 3 species to Copepoda and only 1 species to Ostracoda. The maximum diversity was recorded in winter season while minimum was observed in monsoon season, Sakhare and Kamble (2014) documented the planktonic diversity from Hiranyakeshi River in Kolhapur of Maharashtra and they recorded 24 species of zooplanktons. 9 species belong to Rotifera, 2 species of Ostracoda, 4 species of Cladocera, 4 species of Copepoda and 5 species of Protozoa. The highest species richness of zooplanktons was observed during the summer season, which was attributable to the quantity of phytoplankton on which zooplankton survives, Raut and Solunke (2015) recorded 20 species of zooplanktons in Nagapur Dam, Parli. Out of these 15 species were identified as pollution indicators. The occurance of Branchionuscalciflorus, Branchionus quadridentate, Branchionus angularis, Branchionushavanaensis species indicated the high polluted condition of the water, Bhavimani et al., (2016) studied the biodiversity of lentic Zooplanktons of Madikoppa and Benachi ponds in Karnataka. During their study period, the Zooplanktons biodiversity was represented by 17 species of Rotifera,12 species of Cladocera,6 species of copepoda and 2 species of Ostracoda. They concluded that zooplankton population was dominated by Rotifera followed by Cladocera, Copepoda and Ostracoda, Khan and Pathan (2016) identified and recorded 19 species of zooplanktons from Triveni lake of Amravati. Zooplanktons are represented by five different groups like Protozoa, Rotifera, Cladocera, Copepoda and Ostracoda. Rotifera was found dominant among zooplanktons, Kar and Kar (2016) studied the zooplankton diversity of the Narsingtola pond in Cachar District of Assam. They recorded 42 species of zooplanktons of which 25

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species of Rotifera ,13 species of Cladocera and 4 species of Copepoda. Abundance status and population density of the zooplankton groups were also recorded. The findings suggest that the pond is very much suitable for aquaculture, Abbai and Shivshankar (2017) studied the Zooplankton Diversity of Sogal pond in Belagavi District, North Karnataka. During the study period, 16 different Zooplanktons species belonging to 3 different groups were recorded. The Zooplanktons population of pond is highly influenced by contamination by the discharge of domestic waste, floral offerings, washing clothes, cleaning vehicles, bathing and other anthropogenic activities, Manickam et al., (2018) studied the physicochemical parameters of water and biodiversity of zooplanktons in Ukkadam lake of Coimbatore. They recorded 7 species of Rotifera, 9 species of Cladocera and 5 species of Copepoda. The researchers noticed that there was a clear correlation between temperature and biodiversity abundance. Biodiversity reached its peak during the summer and decreased during the monsoon season. They also linked the impact of global warming to the rise in zooplankton diversity, Sharma and Kumari (2018) studied zooplankton community of Prashar lake in Himachal Pradesh and was represented by Rotifera 10 species, Cladocera 6 species, Protozoa 6 species, Copepoda 3 species and Ostracoda 2 species. They opined that a species presence or absence depends significantly on the microclimate and seasonal variations of the given area. The winter months in Prashar lake had the highest zooplankton density, while the monsoon season had the lowest. Low densities of zooplanktons were the result of high turbidity and heavy rainfall during the monsoon, Kaur and Sidhu (2019) explored the diversity of river Ghaggar of Punjab and recorded 27 genera of zooplankton. Among these, Rotifera consisted of 14 genera, Cladocera 3, Copepoda 7, and Protozoa with 3 genera. Rotifers constituted the major zooplankton diversity in the river. The highest zooplankton diversity was during pre-monsoon season and least was recorded in monsoon season. During pre-monsoon, high rate of decaying vegetation due to high temperature caused abundance of zooplankton while during monsoon, dilution of nutrients due to rain water and high level of turbidity resulted in decreased diversity of zooplankton, Majagi et al., (2019) investigated the zooplankton diversity of Chikklingdalli Dam of Karnataka and recorded Rotifera (Brachionus spp., Euchlanisoropa, Asplanchabrightwelli, Aspalanchapriodont, Filinialongiseta), Cladocera (Ceriodaphniacorunata, Coronotellarectangula, Alonapulchella, Indialonaglobulosa, Daphnia sp., Diaphanosomasarsi, Macrothrixlaticornis, Moina) Copepoda (Mesocyclopsleuckart , Neodiaptomusstrigilipes , Cyclopoid nauplii) and Ostracoda (Hemicycypris sp., Pirocyprissp.) They observed that temperature plays a major role in the distribution of zooplanktons. Abundance of zooplankton was maximum during summer due to high temperature and high standing crop of producers and was less during monsoon and winter, Yogesh (2020) studied biodiversity of zooplankton of Lony Dam reservoir in Reva, Madhya Pradesh and found 6 species of Protozoa,11 species of Rotifera ,6 species of Cladocera and 5 species of Copepoda. He found that Rotifers were discovered to be the most prevalent, predominant and extensively spread among all zooplanktons, Patel and Lahari (2021) has studied zooplankton diversity of a freshwater perennial Singada Lake in Wani city of Yavatmal. He observed 42 species of Zooplanktons belonging to five different classes. Keratellacochlearis of Rotifera was found to be the dominant species among the Zooplankton species observed, Shivaraju and Venkateshwaralu (2021) studied the faunal diversity in Durgadahalli Lake of Tumakuru, Karnataka state, India. A total of 20 species of zooplanktons were recorded,14 Rotifers, 4 Cladocerans and 2 Copepods. They observed most commonly occurring species in lake included Brachionus angularis, Brachionuscaudatus, Keratellatropica, Filinialongiseta, Ceriodaphniacornuta and Moinamicrura. The Rotifer showed highest number of species whereas Copepoda showed lowest number of species of Zooplanktons. They reported that order Rotifera was found to be abundant followed by the order Cladocera and Copepoda in the study area, Momin Heena & Momin Shakir (2021) recorded 10 genera of Rotifera in Diwanshah Lake, Maharashtra, India, Aasidhara Darvekar and Vijay Raut (2022) recorded 13 species of Rotifera in Ramadeshwar Lake (Hirwa Talav) Of Tehsil –Ramtek, District- Nagpur, Maharashtra, India, Patil RG and Chavhan RN (2022) recorded 11 genera of Rotifer in Pardi Lake Gadchiroli, M.S., Ashish S. Gadwe (2022) recorded 17 genera of Rotifera in Small Lentic Ecosystem, Lohara, Gondia, Maharashtra, India, V. D. Dorlikar, S. S. Nimgare and P. M. Telkhade (2023) observe 19 species of Rotifers in Kapileshwar (Ashti) Lake District Wardha (Maharashtra), India. Pandya et al., (2023) aimed to assess the diversity of Zooplanktons in the Surendranagar District of Gujarat, India and recorded total of 35 species of Zooplanktons belonging to five distinct groups namely Protozoa 15 species, Rotifera 12 species, Copepoda 3 species, Cladocera 4 species and Ostracoda 1 species. Highest zooplankton diversity was observed in winter and lowest zooplankton diversity was observed during monsoon season, Rankhamb and Mulgir (2024) recorded

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four groups of zooplanktons namely Rotifera with 7 species, Cladocera with 5 species, Copepoda 3 species and Ostracoda 2 species in Godavari river at Mudgal Dam, Pathari District. With the results, they concluded that the dam shows a good diversity of Zooplanktons indicating the lowest level of pollution. Conclusion.

IV. CONCLUSION

In the present investigation,the maximum Rotifershas been observed during the winter season is probably due to abundance food and favorable temperature and minimum diversity in monsoon season due to rainfall and heavy floods and also Poor water quality and less food availability.

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Table No. 1 : Monthly variation of Rotifer in Gilbili lake.

Sr. No.	Components
1	*Asplanehnopusmyrmeleo*
2	*Brachionus angularis*
3	*Brachionus bidentata*
4	*Brachionuscalyciflorus*
5	*Brachionusfalcatus*
6	*Brachionusforficula*
7	*Brachionusplicatilis*
8	*Brachionusquadridentatus*
9	*Cephalodellagibba*
10	*Euplotes species*
11	*Filinialongiseta*
12	*Horaellabrehmi*
13	*Keratellavalga*
14	*Lecaneluna*
15	*Monostyla bulla*
16	*Philodina sp.*
17	*Philodina roseola*
18	*Platyias quadricornis*
19	*Polyarthra vulgaris*
20	*Rotarianeptunia*

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21	*Testudinellamacroneta*
22	*Trichocercarattus*